

CAPITAL MARKET INDEX

BACKGROUND OF THE INVENTION

The present invention relates to a method of computing a capital market index which represents the "capital market portfolio" of one or more countries. The capital
5 market index is useful as both an investment and an analytical tool.

A market index is an investment and analysis tool useful in measuring present market conditions and changing market conditions. A perfect index would dynamically replicate the entire marketplace and would accomplish the theorists' goal of measuring improvements in marketplace performance. The development of a perfect index would
10 require the use of a "market portfolio" which would account for all sectors of the economy. Although the theoretical "market portfolio" is impractical, a portfolio that closely replicates the "market portfolio" will provide indexes that more accurately reflect the marketplace.

Generally speaking, several indexes have been established for measuring various subsections of the marketplace. For example, the Dow Jones Industrial Average computes an index (based on a stock portfolio selected by Dow Jones) used to measure the equity market. Additionally, the Wilshire 5000 computes an equity index based upon a selected stock portfolio. Similar indexes exist for measuring the bond market and the money market. For instance, Lehman Bros. computes and publishes several bond market
15 indexes and the IBC's Money Fund Report is published as a measure of the money market.
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However, because the above mentioned indexes only measure a subsection of the marketplace, they cannot account for the grouping of different types of financial assets. Further, they cannot account for additions and subtractions between major classes of
25 assets or into or out of the aggregate capital market. For example, if an investor removes capital from the stock market and reinvests into the bond market, an index such as the Wilshire 5000 will only indicate that there was a decrease in capital invested in the equity market. The Wilshire 5000 cannot account for the shifting of capital between markets. Thus, an index such as the Wilshire 5000 cannot provide an accurate picture of the entire
30 marketplace.

The value of being able to track the marketplace more accurately is evidenced by the number of prior art methods and inventions related to portfolio management. For example, U.S. Patent No. 4,597,046 (Musmanno, *et al.*), U.S. Patent No. 4,674,044 (Kalmus, *et al.*), U.S. Patent No. 4,751,640 (Lucas, *et al.*), and U.S. Patent No. 5,774,880 (Ginsberg) are examples of investment managers that are described as automatically trading or utilizing different market segments. However, each of the above use a limited portfolio which only relates to a specific portion of the market rather than the entire marketplace. An investment manager utilizing the entire marketplace is far more desirable to accurately depict the current state of the market in relationship to the economy.

It is, therefore, an object of the present invention to provide a tool for calculating such a manager in the form of an index which represents the entire capital market of one or more countries. Another object of the present invention is to provide a method of calculating an index for measuring the performance of an investment portfolio.

Another object of the present invention is to provide a portfolio that closely replicates the "market portfolio." The "market portfolio" accounts for all sectors of the economy and thus, provides indexes that more accurately reflect the marketplace.

It is also an object of the present invention to provide a single index that represents the total marketplace. The index of the present invention accounts for the grouping of different types of financial market instruments. Prior indexes only measure a subsection of the marketplace and cannot account for additions and subtractions between major classes of assets or into or out of the aggregate capital market. The present invention measures the entire marketplace to account for capital being redirected between classes of assets.

It is also an object of the present invention to provide stock, bond, and money market indexes to be used in place of the presently used stock, bond and money market indexes.

It is also an object of the present invention to provide a tool for simultaneously measuring the different components of the capital markets.

It is also an object of the present invention to provide an index for use by individuals to compare relative performance between portfolios, securities, and other indexed asset classes in the marketplace.

It is also an object of the present invention to provide an index for use by various institutions. Commodity exchanges can utilize the index to create commodities futures contracts. Pension plans and mutual funds can create investment portfolios. Insurance companies and banks can use the index as an asset portfolio measurement tool and an efficient allocation system.

It is also an object of the present invention to provide an index that serves as a benchmark for individuals who are managing pools of capital market assets.

It is also an object of the present invention to provide an index to represent the total marketplace that is dynamic. The method of the present invention shifts weightings between sectors of the capital markets of an economy and tracks changes in that economy as they occur. Thus the index is dynamic and accounts for shifts in the economy.

Other objects, and the advantages, of the present invention will be made clear to those skilled in the art by the following detailed description of the preferred embodiments thereof.

SUMMARY OF THE INVENTION

The present invention relates to computing a capital market index which accurately reflects changes in the entire market. The present invention utilizes an approximate "market portfolio" in order to provide a more accurate representation of the entire marketplace. The capital market index of the present invention is useful both to analyze the economy and to manage investments.

The present invention relates to a method of or an apparatus for arranging the capital market securities within a country or in two or more countries into a single index, a "Capital Market Index," that closely approximates the activities of the securities in the particular marketplace under consideration. The first step in the method of the present invention is to compute or obtain a current, or present day, index of several sectors of the marketplace (i.e., stocks, bonds, money markets, real estate, commercial real estate, art and other collectibles, etc.) under consideration. Next, the indexed market sectors are weighted according to their relative percentage of the overall capital in the marketplace under consideration. The weighted indexes are then combined into a capital market index. The capital market index is a single index representing the total marketplace under consideration that can be used to analyze the market or can be used as a portfolio manager in that marketplace.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is an illustration of the general methodology used in a preferred embodiment of the present invention to compute a capital market index.

5 Fig. 2 is an illustration of the steps used to determine the stock index for use in the preferred embodiment of Fig. 1.

Fig. 3 is an illustration of the steps used to determine the bond index for use in the preferred embodiment of Fig. 1.

Fig. 4 is an illustration of the steps used to determine the money market index for use in the preferred embodiment of Fig. 1.

10 Fig. 5 is an illustration of the general methodology of computing the weighted indexes for use in a preferred embodiment of the present invention.

Fig. 6 is an illustration of the method of recalculating the capital market index for use in a preferred embodiment of the present invention.

15 Fig. 7 is an illustration of the steps of alternative one for selecting the stock portfolio for use the method illustrated in Fig. 2.

Fig. 8 is an illustration of the steps of alternative two for selecting the stock portfolio for use the method illustrated in Fig. 2.

Fig. 9 is an illustration of the steps of alternative three for selecting the stock portfolio for use the method illustrated in Fig. 2.

20 Fig. 10 is an illustration of the steps of alternative one for selecting the bond portfolio for use in the method of Fig. 3.

Fig. 11 is an illustration of the steps of alternative two for selecting the bond portfolio for use in the method of Fig. 3.

25 Fig. 12 is an illustration of the steps of alternative one for selecting the money market portfolio for use in the method of Fig. 4.

Fig. 13 is an illustration of the steps of alternative two for selecting the money market portfolio for use in the method of Fig. 4.

Fig. 14 is an illustration of the steps of alternative one for determining the weight of the indexes for use in the method of Fig. 5.

30 Fig. 15 is an illustration of the steps of alternative two for determining the weight of the indexes for use in the method of Fig. 5.

Fig. 16 is an illustration of the steps of alternative three for determining the weight of the indexes for use in the method of Fig. 5.

Fig. 17 is an illustration of the steps of alternative four for determining the weight of the indexes for use in the method of Fig. 5.

5 Fig. 18 is an illustration of the method of a preferred embodiment of the present invention used to compute an analytical index.

Fig. 19 is a schematic illustration of the method of using the analytical index of the present invention to measure a portfolio.

10 Fig. 20 is an illustration of the method of a preferred embodiment of the present invention used to compute a multi-country index.

DETAILED DESCRIPTION OF INVENTION

The method of a preferred embodiment of the present invention is for arranging the capital market securities within one or more countries into a single index that closely approximates the activities of the securities in the marketplace. Referring first to Fig. 1, an overview of a preferred embodiment of the method of the present invention is illustrated. The first step (indicated generally by the numeral 1000) in the preferred method illustrated in Fig. 1 is to determine a current, or present day, index for one or more sectors of the marketplace (i.e., stocks, bonds, money markets, real estate, etc.). Next, the individual indexes of the different sectors are weighted 5000. To weight the individual indexes, a weighting factor for each index is computed and applied to each index resulted in weighted indexes. Step three, indicated as 6000, combines the weighted indexes into a single capital market index. The capital market index is used as an analysis and measurement tool and as a portfolio manager. Finally, the capital market index is recalculated at a later time and/or date as the sector portfolios change 7000.

25 In the first step 1000 of the general methodology of a preferred embodiment of the present invention, the indexes of all sectors of the marketplace are determined. It is important to note that while the preferred embodiment illustrated in Fig. 1 only utilizes the stock, bond, and money market in its computation of the capital market index, another embodiment (not shown) includes all sectors of the marketplace. The general methodology of the preferred embodiment illustrated in Fig. 1 is equally applicable when 30 all sectors of the marketplace are included. Additional sectors include investments in real estate, commercial real estate, art and other collectibles, etc.

A capital market index computed with the additional sectors included paints a more accurate picture of the marketplace, however, the sheer volume of data involved makes the embodiment less practical. Thus, the first step of the preferred embodiment illustrated in Fig. 1 is detailed in the following discussion as including only the stock, bond, and money markets in the computation of the capital market index. Since these three markets compose the greatest percentage of the overall market, they provide an accurate representation of the entire marketplace. One skilled in the art would, however, recognize that the preferred embodiment illustrated in Fig. 1 is equally applicable to all sectors of the marketplace.

In the first step 1000 of the general methodology, the stock market index is determined 2000. The stock market index is obtained from any of a number of indexes that are reported publicly. For example, the Dow Jones Industrial and the Wilshire 5000 publish stock indexes daily. Although publicly reported indexes can be used, in the preferred embodiment of the present invention illustrated in Fig. 1, the stock market index is computed by the method illustrated in Fig. 2.

The first step detailed in Fig. 2. is that of selecting the stock portfolio 2100. A stock portfolio is an assembly of all of the stocks used in the computation of a particular index. It is important to select as broad of a portfolio as possible so that the computed stock index adequately reflects the equity ownership in the American economy. Three alternatives, 2110, 2120 and 2130 of selecting the stock portfolio of the present invention are illustrated in Figs. 7, 8 and 9. The first alternative 2110 consists of the single step of selecting all marketable securities 2112. The advantage of such a portfolio is that it is the most accurate representation of the equity market because it is comprised of the entire equity market. The resulting index accounts for all of the securities thereby eliminating any sampling error. However, this alternative is also the most impractical to manage. The sheer volume of stocks would make the creation of a stock portfolio for investment purposes very expensive.

The second alternative 2120 for selecting the stock portfolio first requires the computation of the market capitalization of each individual stock 2122. The market capitalization is a representation of the invested capital in the market and is computed by multiplying the number of outstanding shares of each individual stock by the price of each individual stock and then adding any outstanding dividends. The step indicated by

numeral 2124 requires selection of all of the largest stocks. Although a definitive number is not available, to one skilled in the art, selecting the largest stocks generally means selecting stocks which represent 65 - 75% of the total market capitalization. The remaining stocks are then arranged into industry groups and placed in order of 5 diminishing capitalization 2126. From the remaining stocks, 5 - 15% are selected from each industry group 2128. By arranging and selecting from each industry group, a more accurate picture is painted of the overall market. Selecting 15% of the remaining stocks represents a greater diversification, but may approach impracticality due to the sheer volume of stocks in the portfolio.

10 The second alternative 2120 of selecting the stock portfolio has the advantage of accounting for the entire range of capitalization, both the largest and the smaller stocks. Further, the portfolio contains a reasonable amount of securities to be traded if the index is to be used as a portfolio manager. Additionally, whereas some present stock indexes do not account for dividends, the second alternative 2120 includes them in the 15 computation of the market capitalization.

 The third alternative 2130 of assembling a stock portfolio is one in which the first step is to compute the market capitalization for each stock 2132. As discussed above, the market capitalization is computed by multiplying the number of outstanding shares of each stock by its present day market price and then adding in any outstanding dividends. 20 Once the market capitalization is computed, 90% of the 500 largest capitalized stocks are selected 2134. Subsequently, 10% of the small cap stock index is selected to complete the stock portfolio 2136. The advantage of the third alternative 2130 is that the data associated with the stocks is readily available. The largest 500 stocks as well as the small cap index are published in various magazines on a daily basis. Further, the portfolio is 25 broad based which reduces the potential for sampling error.

 Before proceeding, it is important to note that one skilled in the art would recognize that there are a multiplicity of ways in which to select a stock portfolio. Although the preferred embodiment of the present invention illustrated in Fig. 1 discloses several alternatives, the alternatives should not be construed as limitations of the claims. 30 The alternatives each employ a method of selecting a portfolio that will adequately represent the entire stock market subsection of the total marketplace. Regardless of the

method chosen to select the stock portfolio, the methodology of the present invention is still applicable.

The second step detailed in Fig. 2 used to compute the stock index is that of calculating the present day market value of the selected stock portfolio 2200. The present day market value of the stock portfolio is determined by first multiplying the number of outstanding shares of each individual stock in the portfolio by its present day price. Additionally, the individual outstanding dividends associated with each stock must be added back in to gain an accurate figure representing the present value of each stock. Summing the present day market value of the individual stocks equals the total market value of the stock portfolio:

$$\text{Total Market Value} = \sum \text{Present Day Market Values} = \sum [(\text{Shares Outstanding} \times \text{Price}) + \text{Dividends}]$$

The third step detailed in Fig. 2 is that of computing the stock market index 2300. First, an initial period divisor is selected. The divisor is selected based upon convenience of use and purpose. The function of the divisor is to create a more manageable figure to represent the stock market capitalization. Because the stock market capitalization is going to be a figure representing billions of dollars, it is necessary to select a divisor to reduce the figure to a more manageable number. Once the divisor is selected, the total market value of the stock portfolio is divided by the initial period divisor to yield the stock market index.

After computing the stock market index in the first step 1000 of the general methodology of the preferred embodiment of the present invention illustrated in Fig. 1, the bond index is determined 3000. The bond index can be obtained from any of several publicly reported indexes. For example, as discussed above, the Lehman Bros. publish bond indexes daily. Although publicly reported indexes can be used, in a preferred embodiment of the present invention, the bond index is computed by the method illustrated in Fig. 3.

The first computation detailed in Fig. 3 is that of selecting the bond portfolio 3100. It is important to select as broad of a portfolio as possible so that the computed bond index adequately reflects the capital invested in bonds in the American economy. Alternatives 3110 and 3120 of selecting the bond portfolio of the present invention are illustrated in Figs. 10 and 11. The first alternative 3110 consists first of selecting all of the U.S. Treasury and federal agency issues with maturity in excess of one year 3112.

Next, the most recent investment grade corporate bonds with representation by maturity of \$100 million minimum are selected 3114 (those skilled in the art will recognize from this disclosure that the \$100 million minimum has been selected for purposes of convenience and that other minimums may likewise be utilized to advantage in connection with the method of the present invention). Third, representative and liquid (or daily traded) mortgage-backed securities are selected 2116. The final selection is that of representative asset backed securities 3118. The advantage of such a portfolio is that it represents most aspects of the fixed income market with actively traded securities. Further, the information is readily available because the securities are traded often.

The second alternative 3120 of the preferred embodiment of the method of selecting the bond portfolio in the present invention first selects all of the bonds that comprise the portfolio of alternative one 3122. However, in the second alternative 3120 two additional classifications of bonds are added: First, high yield bonds are added 3124. High yield bonds are considered below investment grade and were thus excluded in 3114 of alternative one 3110. The addition of the high yield bonds covers recent developments in the bond market. Second, municipal securities are added 3126. Municipal securities are a big piece of the complete market. Municipal securities provide information about the way people desire to own tax free securities as a consequence of their tax planning. The addition of municipal securities, along with high yield bonds, provides the total bond market structure.

Before proceeding, it is important to note that one skilled in the art would recognize that there are a multiplicity of ways in which to select a bond portfolio. Although the preferred embodiment of the present invention discloses several alternatives, the alternatives should not be construed as limitations of the claims. The alternatives each employ a method of selecting a portfolio that will adequately represent the entire bond market subsection of the total marketplace. Regardless of the method chosen to select the stock portfolio, the methodology of the present invention is still applicable.

The second step detailed in Fig. 3 used to compute the bond index is that of calculating the present day market value of the selected bond portfolio 3200. The present day market value of the bond portfolio is determined by first multiplying the present day price of each security by the amount of each bond outstanding after prepayment and

repurchases. The outstanding amount equals the principal remaining on the bond. The prepayment amount equals the amount prepaid by debtors under their contractual agreement. Next, the amount of interest each bond has accrued is added back in to obtain an accurate market value for each security. Summing the market value of the individual bonds in the portfolio selected equals the total market value of the bond portfolio:

$$\text{Total Market Value} = \sum \text{Present Day Market Values} = \sum \left(\begin{array}{l} \text{Price} \times \text{Amount Outstanding After Prepayments and Repurchases} \\ + \text{Accrued Interest} \end{array} \right)$$

The third step detailed in Fig. 3 is computing the bond market index 3300. First, an initial period divisor is selected. The divisor is selected based upon convenience of use and purpose. The function of the divisor is to create a more manageable figure to represent the bond market capitalization. Because the bond market capitalization is going to be a figure representing billions of dollars, it is necessary to select a divisor to reduce the figure to a more manageable number. Once selected the total market value of the bond portfolio is divided by the initial period divisor to yield the bond market index.

After computing the bond and stock market indexes, the money market index is determined 4000. It should be noted that presently there is no actual money market index. Most practitioners use the money fund index as a substitute. The money fund index is actually just a survey of all money market funds. The money fund index is not weighted by capitalization and there is no standardization from one money market index to the next. The rationale behind the lack of a money market index is that since all money market instruments are short-term (under 1-yr), many practitioners do not consider them worth tracking. Further, the difference between their capitalization figures is so small (T-Bills v. CDs) that there is little or no difference between their yields. Thus, the third step 3000 discloses a method of computing the money market index for use in the computation of the capital market index.

The method of determining the money market index for use in the preferred embodiment illustrated in Fig. 1 is illustrated in Fig. 4. The first step detailed in Fig. 4 is that of selecting the money market portfolio 4100. Alternatives 4110 and 4120 of selecting the money market portfolio of the present invention are illustrated in Figs. 12 and 13. The first alternative 4110 consists first of selecting 100% of the U.S. Treasury and Federal Agency Issues with a maturity of less than one year 4112. Second, the most

recent commercial paper (dealer and directly replaced) are selected 4114. Third, the banker's acceptances with representation by maturity are selected 4116. Finally, corporate issues with a maturity of less than one year are selected 4118. The advantage of such a portfolio is that it covers the entire money market. The first alternative 4110
5 provides the most accurate picture of the money market.

The second alternative 4120 of selecting the money market portfolio consists first of selecting the three month Treasury Bill returns for U.S. Treasuries 4122. Secondly, a 50/50 blend of CDs and Banker's Acceptances for other money market instruments is selected 4124. The advantage of such a portfolio is that it is easily calculated. The
10 second alternative 4120 provides a good approximation of the money market with readily available data.

Before proceeding, it is important to note that one skilled in the art would recognize that there are a multiplicity of ways in which to select a money market portfolio. Although the preferred embodiment of the present invention discloses several
15 alternatives, the alternatives should not be construed as limitations of the claims. The alternatives each employ a method of selecting a portfolio that will adequately represent the entire money market subsection of the total marketplace. Regardless of the method chosen to select the money market portfolio, the methodology of the present invention is still applicable.

20 The second step detailed in Fig. 4 used to compute the money market index is that of calculating the present day market value of the selected money market portfolio 4200. The present day market value of the money market portfolio is determined by first multiplying the present day price of each security by the amount of each money market instrument outstanding after prepayment and repurchases. The outstanding amount
25 equals the principal remaining on the instrument. The prepayment amount equals the amount prepaid by debtors under their contractual agreement. Next, the amount of interest each instrument has accrued is added back in to obtain an accurate market value for each instrument. Summing the market value of the individual instruments equals the total market value of the money market portfolio:

$$30 \quad \text{Total Market Value} = \sum \text{Present Day Market Values} = \sum \left(\begin{array}{l} \text{Price} \times \text{Amount Outstanding After Prepayments and Repurchases} \\ + \text{Accrued Interest} \end{array} \right)$$

The third step detailed in Fig. 4 is the computation of the money market index. First, an initial period divisor is selected. The divisor is selected based upon convenience of use and purpose. The function of the divisor is to create a more manageable figure to represent the money market capitalization. Because the money market capitalization is going to be a figure representing billions of dollars, it is necessary to select a divisor to reduce the figure to a more manageable number. Once selected the total market value of the money market portfolio is divided by the initial period divisor to yield the money market index.

Referring back to Fig. 1, illustrating the general methodology of the preferred embodiment of the present invention, the second step 5000 of the method requires that the individual indexes (stock, bond, and money market) be weighted. Weighting of the indexes is necessary to acquire an accurate picture of the total marketplace. An accurate picture should reflect the amount of the total market capitalization that exists in the individual subclasses of the market.

As illustrated in Fig. 5, there are four alternatives, 5100, 5200, 5300 and 5400, discussed in relation to the weighting of the indexes 5000. The first alternative 5100, places heavy reliance on the Federal Release Z1 papers. The Federal Release Z1 "Flow of Funds" document is published by the Federal Reserve each quarter. The document shows the distribution of capital throughout the marketplace. The advantage of using the Flow of Funds document is that the basic data comes from a neutral source which is relatively unbiased.

Fig. 14 illustrates the first alternative 5100. In the first step of the alternative, several values indicating their respective capital levels are obtained from the Federal Release Z1 5110. First, the Open Market Paper level is read from the Federal Release Z1. Open Market Paper (OMP) is mainly commercial paper which is issued by corporations and carries an interest rate that can be bought and sold. In the Flow of Funds document, Bankers Acceptances are also included. Next, the U.S. Government Securities Level (GOVT), which represents government bonds including agency securities as well as mortgage pool securities, are read from the Federal Release Z1 papers. It is also necessary to read the Savings Bonds (SB) level and the Monetary Authority (MA) level from the Federal Release Z1 papers. Next, the Corporate and Foreign Bond (CORP) level is read. Finally, the Equity Market Value (EMV), which

represents the equity portion of the market including privately held companies which could come to market "at any time", is read from the Federal Release Z1 papers.

In addition to the Federal Release Z1 document, alternative one also relies on obtaining the Treasury Bill Holdings level from the U.S. Treasury Release 5120. The 5 Treasury Bill Holdings (TBH) level represents treasury bills issued by the Federal Government. The level represents the amount held by the public and available to be bought and sold in the open market. Also, short term Federal Agency securities (those having less than one year of maturity) are included.

The third step of alternative one requires computation of the money market 10 holdings (MMH) 5130. The money market holdings are equal to the sum of the Open Market Paper (OMP) and the Treasury Bill Holdings (TBH):

$$MMH = OMP + TBH$$

Next, the Bond Holdings (BH) are computed 5140. The Bond Holdings (BH) equals the 15 Government Securities (GOVT) minus the sum of the Savings Bonds (SB), the Monetary Authority (MA) and the Treasury Bill Holdings (TBH), plus the Corporate and Foreign Bonds (CORP):

$$BH = GOVT - \Sigma(SB, MA, TBH) + CORP$$

Next, compute the entire Capital Markets Level (CAPM) by summing the Equity Market Value (EMV), the Bond Holdings (BH), and the Money Market Holdings (MMH) 4015. 20 The EMV was obtained from the Federal Release Z1, the MMH was calculated in step 4013, and the BH was computed in step 5150:

$$CAPM = \Sigma(EMV, BH, MMH)$$

The sixth step of alternative one 5100 computes the actual percentage weight given to each individual index 5160 (stock, bond, and money market). Each of the 25 individual market values (Equity Market Value, Bond Holdings, and Money Market Holdings) are divided by the Capital Markets Level to determine each markets participation in the whole:

$$\text{Stock Weight (STW)} = \frac{EMV}{CAPM}$$

$$\text{Bond Weight (BW)} = \frac{BH}{CAPM}$$

30 $\text{Money Market Weight (MMW)} = \frac{MMH}{CAPM}$

Once the percentage weights are computed (STW, BW, and MMW), each individual index computed in step one 1000 of the general methodology is multiplied by the percentage weights in order to determine the weighted indexes 5170:

$$\text{Weighted Stock Index (WSI)} = \text{Stock Index} \times \text{STW}$$

5 $\text{Weighted Bond Index (WBI)} = \text{Bond Index} \times \text{BW}$

$$\text{Weighted Money Market Index (WMMI)} = \text{Money Market Index} \times \text{MMW}$$

The second alternative 5200 discussed in regards to weighting the indexes is illustrated in Fig. 15. The second alternative 5200 includes all of the security types and thereby paints a slightly more accurate picture. For example, municipal securities are included in this second alternative. Inclusion of municipal bonds requires creation of a municipal index. Given the size of the municipal market (there are over 500,000 different municipal bond issues), compiling a municipal index is a considerable task. As such, the first alternative 5100 for weighting is preferred. However, those skilled in the art will recognize from this disclosure that if the tax laws change then it is important to integrate municipal securities into the bond sector.

Referring to Fig. 15, the first step of the alternative 5200 requires obtaining the Municipal Bond Holdings (MBH) level from the Federal Release Z1 5210. Next, the Municipal Bond Holdings (MBH) are added in to the Bond Holdings (BH) as computed in alternative one 5220:

20 $\text{Bond Holdings with Municipals} = \text{MBH} + \text{BH}$

Next, the Project Note Level (PNL) is obtained from the Federal Reserve and dealer information 5230. The Project Note Level is a measure of the short term municipal securities.

The fourth step in alternative two is to add the Municipal Bond Holdings (MBH) to the short term holdings (Money Market Holdings computed in alternative one) to compute the Money Market Holdings with Municipals (MMHWM) 5240:

$$\text{MMHWM} = \text{MM} + \text{MBH}$$

Next, compute the entire Capital Markets Level with Municipals (CAPMWM) by summing the Equity Market Value (EMV), the Bond Holdings with Municipals (BHWM), and the Money Market Holdings with Municipals (MMHWM) 5250:

$$\text{CAPMWM} = \Sigma(\text{EMV}, \text{BHWM}, \text{MMHWM})$$

The sixth step of alternative two 5200 is the computation of the actual percentage weight given to each individual index 5260 (stock, bond, and money market). Each of the individual market values (Equity Market Value, Bond Holdings with Municipalities, and Money Market Holdings with Municipalities) are divided by the Capital Markets Level with Municipalities to determine each markets participation in the whole:

$$\text{Stock Weight (STW)} = \frac{\text{EMV}}{\text{CAPMWM}}$$

$$\text{Bond Weight (BW)} = \frac{\text{BHW}}{\text{CAPM}}$$

$$\text{Money Market Weight (MMW)} = \frac{\text{MMHWM}}{\text{CAPM}}$$

Once the percentage weights are computed (STW, BW, and MMW), each individual index computed in step one 1000 of the general methodology is multiplied by the percentage weights in order to determine the weighted indexes 5270:

$$\text{Weighted Stock Index (WSI)} = \text{Stock Index} \times \text{STW}$$

$$\text{Weighted Bond Index (WBI)} = \text{Bond Index} \times \text{BW}$$

$$\text{Weighted Money Market Index (WMWI)} = \text{Money Market Index} \times \text{MMW}$$

The third alternative 5300 discussed in regards to weighting the indexes is illustrated in Fig. 16. The third alternative 5300 is a simple calculation that can be used in countries where the money market remains fairly constant. For example, in the United States the percentage of capital in the money market varies little when compared with the stock and bond markets. Thus, alternative three 5300 is a much simpler calculation but is not as precise as alternative one or two.

The first step of the third alternative is to compute the bond weight 5310. The bond weight is computed using the stock index market value and the bond market index value computed in 2200 and 3200, respectively, of the general methodology of the preferred embodiment of the present invention. The computation requires that the bond index market value be divided by the sum of the bond index market value and the equity index market value:

$$\text{Bond Weight (BW)} = \frac{\text{Bond Index Market Value}}{\sum (\text{Bond Index Market Value}, \text{Equity Index Market Value})}$$

The stock weight (STW) is computed in alternative three by taking 90% of the bond weight 5320. Finally, step 5330 of this third alternative computes the money market

weight (MMW) as 10% of the bond weight. Once the percentage weights are computed (STW, BW, and MMW), each individual index computed in step one 1000 of the general methodology is multiplied by the percentage weights in order to determine the weighted indexes 5340:

5 Weighted Stock Index (WSI) = Stock Index × STW

Weighted Bond Index (WBI) = Bond Index × BW

Weighted Money Market Index (WMMI) = Money Market Index × MMW

The fourth alternative 5400 discussed in regards to weighting the indexes is illustrated in Fig. 17. The fourth alternative 5400 is a simple calculation that does away 10 with the arbitrary percentages (90% for stocks, 10% for money market) chosen in alternative three in 5320 and 5330, respectively. However, similarly to alternative three, alternative four is not as precise.

The first step of alternative four is to compute the capital market value 5410. The capital market value is the sum of the stock index market value (EMV), the bond index market value (BMV), and the money market index value (MMMV). The stock market, bond market, and money market index values were calculated in 2200, 3200, and 4200, respectively:

15 Capital Index Market Value (CAMV) = $\sum \left(\begin{array}{l} \text{STOCK MARKET INDEX VALUE, BOND INDEX} \\ \text{MARKET VALUE, MONEY MARKET INDEX VALUE} \end{array} \right)$

Once the capital market index value is computed, the individual weights are 20 computed by dividing the individual market values by the capital market index value 5420, 5430 and 5440:

Stock Weight (STW) = $\frac{\text{EMV}}{\text{CAMV}}$

Bond Weight (BW) = $\frac{\text{BMV}}{\text{CAMV}}$

Money Market Weight (MMW) = $\frac{\text{MMMV}}{\text{CAMV}}$

25 Once the percentage weights are computed (STW, BW, and MMW), each individual index computed in step one 1000 of the general methodology is multiplied by the percentage weights in order to determine the weighted indexes. This final step is indicated by numeral 5450 on Fig. 17:

$$\text{Weighted Stock Index (WSI)} = \text{Stock Index} \times \text{STW}$$

$$\text{Weighted Bond Index (WBI)} = \text{Bond Index} \times \text{BW}$$

$$\text{Weighted Money Market Index (WMMI)} = \text{Money Market Index} \times \text{MMW}$$

Before proceeding, it should be noted that one skilled in the art would recognize
5 that the method of weighting the individual indexes 5000 is equally applicable if more
sectors of the marketplace are included. As discussed above, the general methodology of
the preferred embodiment illustrated in Fig. 1 of the present invention only accounts for
the sectors of the marketplace including the stock, bond, and money market indexes.
However, in an alternative embodiment of the present invention (not shown) additional
10 sectors are included. If additional sectors are included, the method of weighting 5000 is
equally applicable. The individual market values of each included sector is summed, and
then each individual sector market value is divided by the sum to determine its individual
weight:

$$\text{Sector Weight} = \frac{\text{Sector Market Value}}{\sum \text{All Sector Market Values}}$$

Referring back to Fig. 1, the third step 6000 of the general methodology of the
preferred embodiment of the present invention is illustrated. The third step 6000 requires
that the individual weighted indexes computed in step two 5000 be combined into a
single index. The combination of the weighted indexes allows an accurate picture of the
economy be reflected by a single index.

Presently, as mentioned above, the industry speaks in terms of the stock market,
the bond market, and the money market as being separate unrelated entities. The theory
is that the market is very efficient. The efficiency of the market being that buyers and
sellers have the ability to process all of the available information and that collective
judgment of the individual buyers and sellers controls the pricing of different sectors of
25 the market. However, presently, each market is considered individually, independent of
influences from other markets.

If all three markets individually are considered efficient, in theory the
combination of the three must also be efficient. The ability to measure all financial assets
on the basis of a common yardstick will result in an extremely efficient portrait of the
30 economy. The portrait of the economy should not be based on how people view
Microsoft v. Compaq, but rather how people view Microsoft v. Compaq v. Bonds v.

Money Markets, etc. Prior attempts to combine the indexes did not yield satisfactory results because there was no attempt to weight the individual indexes. Thus, the combining of the weighted indexes results in a capital market index reflective of the total marketplace.

5 The combination in step three 6000 can be performed in several ways. In a preferred embodiment of the present invention, the different market indexes (stock, bond, and money market) are simply added together to reveal a combined capital market index number. However, one skilled in the art will recognize that the indexes can be combined by any mathematical operation. The key is that the mathematical operation must be
10 consistent each time in determining the index at subsequent times in order to provide accurate analysis. Further, the combination must be of weighted indexes in order to reflect the entire portrait of the marketplace of the economy.

15 Again referring to Fig. 1, step four 7000 of the general methodology of the preferred embodiment of the present invention is illustrated. The final step 7000 calls for recalculation of the capital market index as the portfolio changes over time. In order to most accurately reflect the economy, it is important to only have the most liquid stocks, bonds, and money market instruments represented. The most liquid securities are those that are presently traded and those obviously still in existence.

20 The method of recalculating the total market index is illustrated in Fig. 6. The first step is to remove the stocks, bonds, and money market instruments no longer traded or no longer on the market from their respective portfolios 7100. Once removed, they are replaced with securities which are presently being traded but were not included in the initial portfolio in order to continue to represent the same portion of the total marketplace 7200. Third, for each changed portfolio, a new market value must be calculated per the
25 methods disclosed in 2200, 3200, and 4200.

30 Changes in the indexed portfolio results in changes in that indexes market value. Dividing the new market value by the initial period divisor selected in steps 2300, 3300, and 4300 would obviously result in a different value for the index. However, comparing the two indexes would reveal little in the way of analysis. Thus, the fourth step requires normalization of the index 7400. The normalization essentially equates the market value of the initial period market value with the market value of the new portfolio. Normalization requires calculation of a new divisor. The new divisor equals the initial

period divisor multiplied by the new market value of the portfolio divided by the initial period market value:

$$\text{New Divisor} = \text{Previous Divisor} \times \frac{\text{New Market Value}}{\text{Previous Market Value}}$$

Finally, the market index for the changed portfolio is computed by dividing the new
5 market value of the capital market portfolio by the new divisor 7500.

The market index for the changed portfolio computed by the methods of step four
7000 is considered a practical index. The practical index is useful for commodity trading
and day to day trading. However, the practical market index does not account for
changing government data. Thus, the market index calculated by the methods of step
10 four 7000 is not completely accurate when used for research or for evaluation purposes.

To account for changing government data, an analytical index is necessary. The
method of the preferred embodiment of the present invention used to compute an
analytical index is illustrated in Fig. 18. An analytical index is useful for research and for
evaluating performance of the marketplace over time. The first step of the method of the
preferred embodiment illustrated in Fig. 18 is to obtain the revised government data
15 8100. As the government revises earlier released data relevant to securities used in the
generation of the capital market index, the data must be obtained. Once obtained, the
market index of the earlier time must be recalculated and reweighted 8200. Finally, the
market index computed at each subsequent time period leading to the present must be
20 recalculated and reweighted 8300. In order to recalculate and reweight the market
indexes of the earlier time periods (steps 8200 and 8300), the general methodology of the
preferred embodiment illustrated in Fig. 1 of the present invention is used. The resulting
set of indexes is useful for research and evaluation purposes because all of the indexes
are calculated based on the same set of government data.

25 Referring now to Fig. 19, the use of an index, referred to as the "Capital Market
Index," or "CMI," is calculated in accordance with the method of the present invention
for measuring a portfolio is illustrated. Any portfolio is benchmarked against the CMI by
calculating the returns of the particular portfolio under consideration and the standard
deviation of the returns and comparing these statistics against the returns and the standard
30 deviation of the CMI. The comparison, illustrated in Fig. 19, shows that the portfolio
under consideration will have either (a) greater return and less risk (quadrant 1 of Fig.

19), (b) greater return and greater risk (panel 2 of Fig. 19), (c) less risk and less return (panel 3), or (d) less return and greater risk (panel 4) than the CMI. Portfolios are compared by measuring the differences between each portfolio and the CMI.

Another preferred embodiment of the present invention is illustrated in Fig. 20.
5 The method of the embodiment illustrated in Fig. 20 is used to compute a multi-country index. A multi-country index can be used to track the market performance of an individual country in relation to the cumulative marketplace of several countries. The first step in the method is to compute the index and the market value of the index in each country 9100. Both the country index (CI) and the market value (MV) of the index are
10 computed by the methods of the preferred embodiment of the general methodology illustrated in Fig. 1 of the present invention. Next, the currency value (CV) of each of the countries must be obtained 9200. The currency value (CV) can be obtained from a multiplicity of published sources. Finally, the multi-country index (MCI) is computed by summing the resultants calculated by multiplying the index (CI), the market value (MV),
15 and the currency value (CV) of each country. Subsequently, the sum of the resultants is divided by the sum of the resultants calculated by multiplying the market value (MV) and the currency value (CV) of each market:
20

$$MCI = \frac{\sum (CI \times MV \times CV)_1 + (CI \times MV \times CV)_2 + \dots + (CI \times MV \times CV)_N}{\sum (MV \times CV)_1 + (MV \times CV)_2 + \dots + (MV \times CV)_N}$$

The resulting multi-country index (MCI) gives a reference value by which the Capital Market index of an individual country can be compared.

In another preferred embodiment of the present invention, the method is performed by use of a computer program. A computer or other electronic device can perform the iterative calculations and assemble the data more accurately and more efficiently than in the manner described herein, and the program for operating the computer is written by persons skilled in the art of computer programming as a matter of routine from the above description of the method of the present invention. When the general methodology is encoded into a computer or a computer program, the resulting preferred embodiment of the present invention is an apparatus for calculating an index which represents the "capital market portfolio" of a country. In yet another preferred embodiment, a computer having such a program encoded in the memory thereof is utilized to continually calculate and update the Capital Market Index in accordance with
25
30

the method of the present invention and one or more additional computers operated by users in remote locations are used to access the Index as it is continually calculated by the computer having the program encoded thereon for measuring the performance of a portfolio that is managed by the remote user in the manner described above in connection
5 with Fig. 19. Such access is accomplished, for instance, over a global communications network (the "Internet"), by dedicated line, or by other electronic communication methods known in the art.

Although described herein in terms of a preferred embodiment and a number of alternative embodiments, those skilled in the art will recognize that a number of changes
10 can be made to the method of the present invention which do not change the manner in which the steps in the method function to achieve their intended result. All such changes are intended to fall within the spirit and scope of the present invention as set out in the following, non-limiting claims.